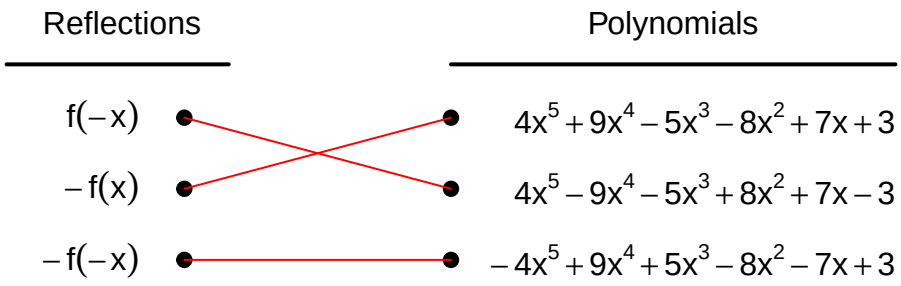
Name: Date:

Exam: Function Reflections (Solution version 626)

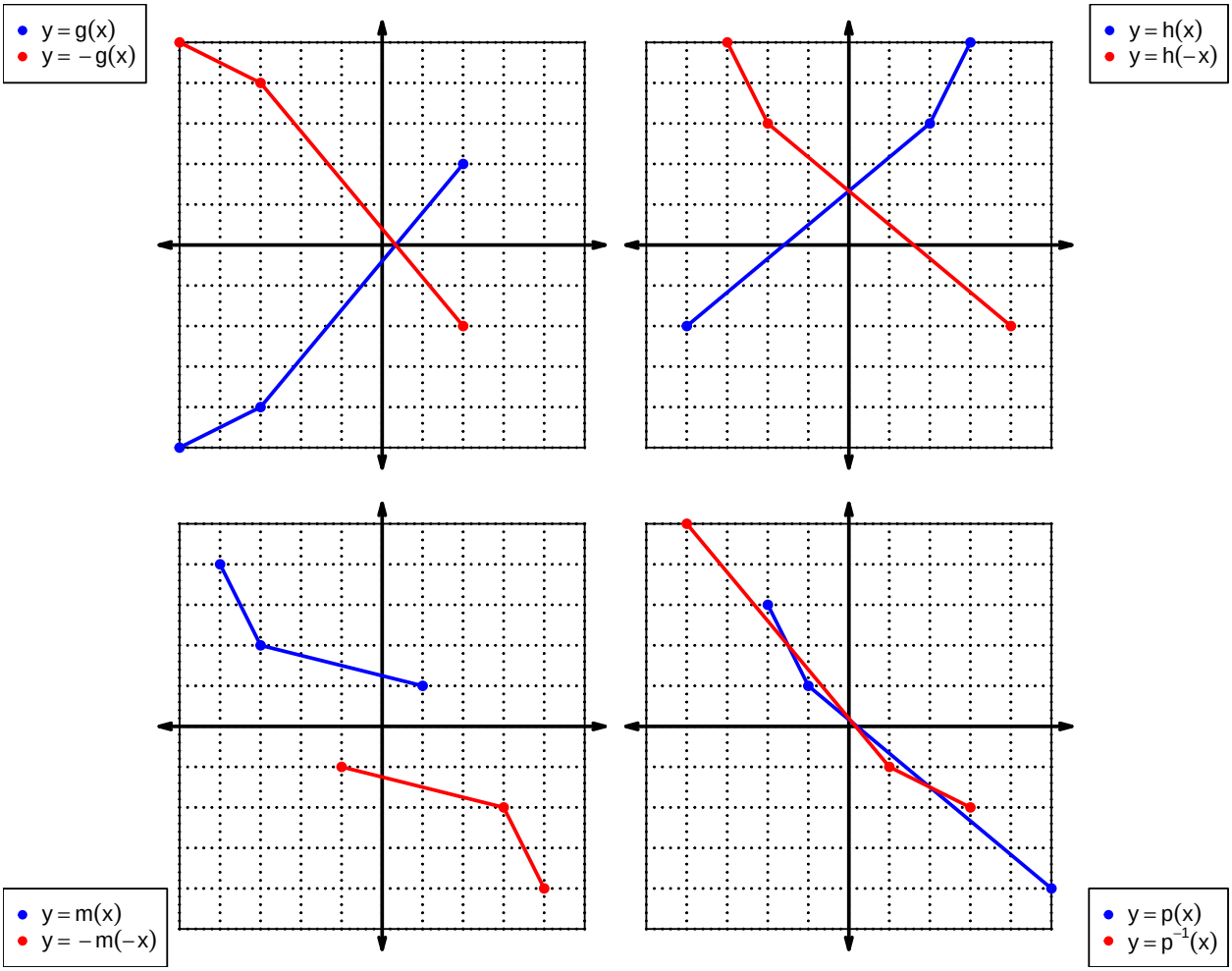
1. (worth 9 points) Let function f be defined by the polynomial below:

$$f(x) = -4x^5 - 9x^4 + 5x^3 + 8x^2 - 7x - 3$$

Draw lines that match each function reflection with its polynomial:



2. (worth 20 points) In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	2	7	5
2	5	9	7
3	9	5	1
4	7	6	4
5	8	1	6
6	1	2	8
7	6	3	9
8	3	4	2
9	4	8	3

3. (worth 3 points) Evaluate $h(7)$.

$$h(7) = 9$$

4. (worth 3 points) Evaluate $g^{-1}(1)$.

$$g^{-1}(1) = 5$$

5. (worth 3 points) Assuming h is an **even** function, evaluate $h(-6)$.

If function h is even, then

$$h(-6) = 8$$

6. (worth 3 points) Assuming f is an **odd** function, evaluate $f(-4)$.

If function f is odd, then

$$f(-4) = -7$$

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7. (worth 15 points) A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
Let polynomial p be defined with the following equation:

$$p(x) \;=\; x^3 - 1$$

a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) \;=\; (-x)^3 - 1$$
$$p(-x) \;=\; -x^3 - 1$$

b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) \;=\; -\left(-x^3 - 1\right)$$
$$-p(-x) \;=\; x^3 + 1$$

c. Is polynomial p even, odd, or neither?

neither

d. Explain how you know the answer to part c.

We see that $p(x)$ is not equivalent to either $p(-x)$ or $-p(-x)$, so p is neither even nor odd.

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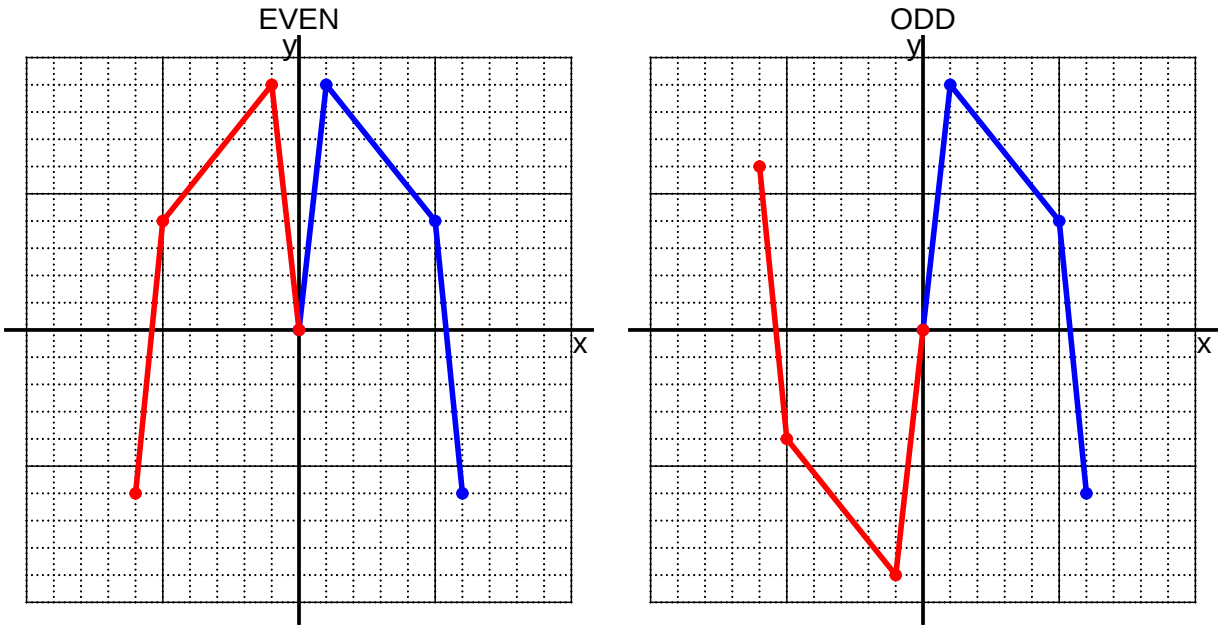
8. (worth 10 points) I have drawn half of a function. Draw the other half to make it even or odd.



9. (worth 10 points) Let function f be defined with the equation below.

$$f(x) = 3(x+7)$$

a. Evaluate $f(22)$.

step 1: add 7
step 2: multiply by 3

$$f(22) = 3((22)+7)$$
$$f(22) = 87$$

b. Evaluate $f^{-1}(66)$.

step 1: divide by 3
step 2: subtract 7

$$f^{-1}(x) = \frac{x}{3} - 7$$
$$f^{-1}(66) = \frac{(66)}{3} - 7$$
$$f^{-1}(66) = 15$$

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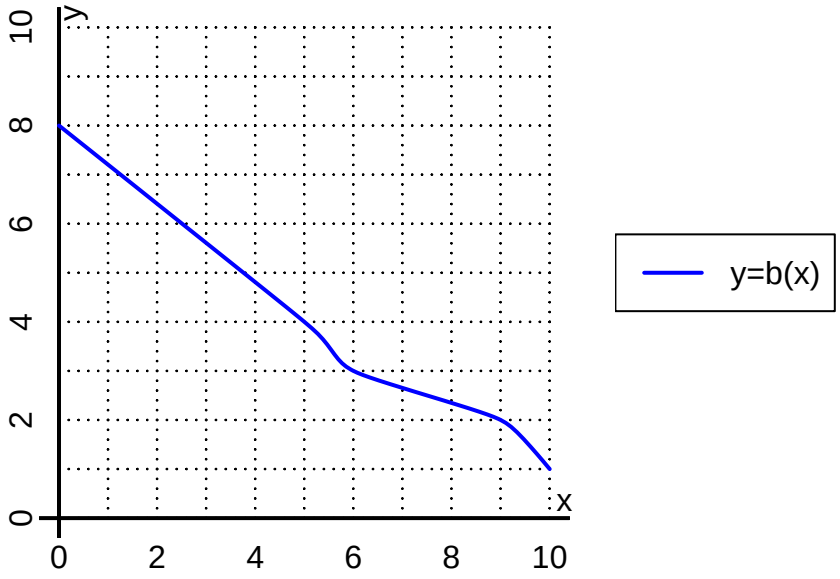
10. (worth 6 points) The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(5)$.

$b(5) = 4$

b. Evaluate $b^{-1}(2)$.

$b^{-1}(2) = 9$

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11. (worth 18 points) Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-9	9	-9	9
-1	7	-7	7	-7
0	0	0	0	0
1	7	-7	7	-7
2	-9	9	-9	9

b. Is function f even, odd, or neither?

even

c. How do you know the answer to part b?

Function f is even because column $f(-x)$ matches column $f(x)$ exactly.